

ART 34 AMDT

Claims

1. A method for processing signals received from different radio interfaces of communication systems, **characterized** in that it comprises steps in which

- a carrier-frequency signal is received from a radio interface,
- 5 - the signal at the carrier frequency is bandpass-filtered,
- the filtered signal at the carrier frequency is amplified,
- an RX mixing signal at the receive frequency is generated,
- a complex baseband signal is generated from the received carrier-frequency signal by mixing it with the RX mixing signal,

- 10 - the baseband signal generated is low-pass filtered,
- the baseband signal generated is amplified or attenuated prior to analog-to-digital conversion,

- the baseband signal is converted digital, and
- the baseband signal converted digital is processed so as to produce an information
15 signal encoded and modulated into the received signal,
wherein the signal processing parts for processing receive frequency signal are
common for signals received from at least two different radio interfaces.

2. A method for processing signals transmitted to different radio interfaces of communication systems, **characterized** in that it comprises steps in which

- 20 - a digital baseband quadrature signal is generated on the basis of the information signal to be transmitted,

- the digital baseband signal is converted analog,
- a TX mixing signal at the transmit frequency is generated,
- a carrier-frequency transmission signal is generated from the baseband signal by
25 mixing it with the TX mixing signal,

- the carrier-frequency signal generated is amplified, and
- the transmission signal is transmitted to the radio interface,
wherein the signal processing parts for processing transmit frequency signal are
common for signals received from at least two different radio interfaces.

30 3. A direct-conversion receiver operating at different radio interfaces of communication systems, **characterized** in that it comprises

- antenna means for receiving a carrier-frequency signal from a radio interface,
- bandpass filter (2) for filtering the carrier-frequency signal,
- first receiver amplifier (4) for amplifying the filtered carrier-frequency signal,
- 35 - means (10, 11) for generating an RX mixing signal at the receive frequency,

- mixing means (5) for generating a complex baseband signal from the received signal by means of the RX mixing signal,
- low-pass filter (6) for filtering the baseband signal,
- second amplifier (7) for amplifying the baseband signal,
5 - analog-to-digital converter (8) for converting the baseband signal digital, and
- means (9) for processing the baseband signal converted digital so as to produce an information signal encoded and modulated into the received signal,
wherein the signal processing parts for processing receive frequency signal are common for signals received from at least two different radio interfaces.

10 4. The receiver of claim 3, **characterized** in that it comprises means for selecting the pass band of the bandpass filter (2, FX1) such that it corresponds to the receive frequency.

5 5. The receiver of claim 3 or 4, **characterized** in that it comprises means for controlling the gain of said first amplifier.

6 6. The receiver of any one of claims 3 to 5, **characterized** in that the means (10, 11) for generating a mixing signal at the receive frequency comprises an RX synthesizer (10, S1) and controllable frequency divider (11, N1) for dividing the frequency of the output signal generated by the RX synthesizer.

20 7. The receiver of claim 6, **characterized** in that said frequency divider is arranged so as to divide the output signal of the RX synthesizer always by at least two in order to generate an RX mixing signal.

8. The receiver of any one of claims 3 to 7, **characterized** in that it comprises means (6, FX3) for controlling the cut-off frequency of low-pass filtering in order to perform channel filtering according to the selected radio interface.

25 9. The receiver of any one of claims 3 to 8, **characterized** in that it comprises means for implementing channel filtering realized in a digital manner.

10. The receiver of any one of claims 3 to 9, **characterized** in that it comprises means (7, GX2) for controlling the gain of the second amplifier.

30 11. The receiver of any one of claims 3 to 10, **characterized** in that the signal processing path comprises substantially the same components for connecting to the different radio interfaces.

12. A direct-conversion transmitter operating at different radio interfaces of communication systems, **characterized** in that it comprises

- means (9) for generating a digital baseband quadrature signal on the basis of the information signal to be transmitted,

5 - digital-to-analog converter (14) for converting the baseband transmission signal analog,

- synthesizer (10, 11) for generating a TX mixing signal at the transmit frequency,

- mixing means (16) for producing a signal at the carrier frequency from the baseband transmission signal by means of the TX mixing signal,

10 - transmitter amplifier (7, 8) for amplifying the signal at the carrier frequency, and

- antenna means for transmitting the amplified transmission signal at the carrier frequency,

wherein the signal processing parts for processing transmit frequency signal are common for signals received from at least two different radio interfaces.

13. The transmitter of claim 12, **characterized** in that it comprises a controllable low-pass filter (15, FX4) for filtering a baseband transmission signal in order to perform channel filtering according to the radio interface selected.

14. The transmitter of claim 12 or 13, **characterized** in that it comprises means for implementing channel filtering realized in a digital manner.

15. The transmitter of claim 12, 13 or 14, **characterized** in that the means (10, 11) for generating a TX mixing signal at the transmit frequency comprises a TX synthesizer (13, S2) and controllable frequency divider (12, N2) for dividing the frequency of the output signal generated by the TX synthesizer.

16. The transmitter of claim 15, **characterized** in that said frequency divider is arranged so as to divide the TX synthesizer's output signal always at least by two in order to generate a TX mixing signal.

17. The transmitter of any one of claims 12 to 16, **characterized** in that it comprises means (17, GX3) for controlling the gain of the transmitter amplifier.

18. The transmitter of any one of claims 12 to 17, **characterized** in that it comprises means (18, BX) for controlling the operating frequency band of the transmitter amplifier.

19. The transmitter of any one of claims 12 to 18, **characterized** in that it comprises a bandpass filter for filtering the amplified transmission signal at the

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